

CLAIMS

What is Claimed is:

1. A multifunction antenna comprising:
 - a printed circuit board having a first side and a second side;
 - a metallized ground plane patterned on the first side of the printed circuit board;
 - a plurality of curved slot antenna elements formed in the metallized ground plane on the first side of the printed circuit board; and
 - at least one patch antenna element formed on the second side of the printed circuit board.
2. The antenna according to claim 1 wherein each slot antenna element has a different length.
3. The antenna according to claim 1 wherein the plurality of slot antenna elements include an AMPS antenna element, a PCS antenna element, a GSM antenna element and terrestrial radio antenna element.
4. The antenna according to claim 1 wherein the at least one patch antenna element includes a GPS antenna element and a satellite radio antenna element.
5. The antenna according to claim 1 wherein the at least one of the

patch antenna element is a corner fed patch antenna element to provide a circularly polarized radiation pattern.

6. The antenna according to claim 1 wherein the at least one of the patch antenna element is an edge fed antenna element where a first feed line is electrically coupled to one side of the patch antenna element and a second feed line is electrically coupled to an orthogonal side of the patch antenna element to provide a circularly polarized radiation pattern.

7. The antenna according to claim 1 further comprising a microstrip feed line patterned on the second side of the printed circuit board and at least one shorting via electrically coupled to the ground plane, said microstrip feed line feeding the plurality of slot antenna elements.

8. The antenna according to claim 1 further comprising at least one low noise amplifier mounted on the printed circuit board, said at least one amplifier being electrically coupled to at least one of the antenna elements.

9. The antenna according to claim 1 further comprising a diplexer mounted on the printed circuit board, said diplexer separating the signals received on a common feed line or feed distribution network from the plurality of slot antenna elements.

10. The antenna according to claim 1 wherein each of the plurality of slot antenna elements includes a receive/transmit circuit mounted on the printed circuit board, each receive/transmit circuit including electrical components for directionally coupling receive and transmit signals into separate receive and transmit paths, and an amplifier for amplifying the receive and transmit signals.

11. A method for fabricating a multifunction antenna, said method comprising:

providing a printed circuit board having a first side and a second side;

forming a plurality of antenna elements in the first side of the printed elements in the first side of the printed circuit board;

forming a plurality of antenna elements in the second side of the printed circuit board; and

forming a plurality of feed lines in the first side or the second side of the printed circuit board, said feed lines providing feed signals for the plurality of antenna elements formed on the first and second side of the printed second board.

12. The method according to claim 11 wherein forming a plurality of antenna elements on the first side of the printed circuit board includes forming a GPS antenna element and a satellite antenna element on the first side of the printed circuit board.

13. The method according to claim 11 wherein forming a plurality of

antenna elements on the first side of the printed circuit board includes forming a plurality of patch antenna elements on the first side of the printed circuit board.

14. The method according to claim 11 wherein forming a plurality of antenna elements on the second side of the printed circuit board includes forming a plurality of slot antenna elements on the second side of the printed circuit board formed in a common ground plane.

15. The method according to claim 14 wherein each slot antenna element has a curved configuration.

16. The method according to claim 14 wherein each slot antenna element has a different length.

17. The method according to claim 14 wherein the plurality of slot antenna elements include an AMPS antenna element, a PCS antenna element, a GSM antenna element and a terrestrial radio antenna element.

18. The method according to claim 11 wherein forming the plurality of feed lines includes forming a microstrip feed line patterned on the first side of the printed circuit board and at least one shorting via electrically coupled to the ground plane, wherein the microstrip feed line feeds the plurality of slot antenna elements.

19. A method for fabricating a multifunction antenna, said method comprising:

providing a first printed circuit board;

providing a second printed circuit board coupled to the first printed circuit board at an angle thereto;

forming a plurality of slot antenna elements on the first printed circuit board; and

forming at least one antenna element on the second printed circuit board.

20. The method according to claim 19 wherein forming the plurality of slot antenna elements includes forming the plurality of slot antenna elements to have different lengths.